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Landmark in Industrial Democracy

A report on the balloted decision of General Electric Company employes in Schenectady, N. Y., to have Local 301 of the United Electrical and Radio Workers of America represent them in collective bargaining has been to Washington by Mrs. Elinore M. Herrick, director of the National Relations Board.

"This election is of particular significance in the field of industrial relations because it is the first election of such magnitude held by the board with the consent of the employer. The General Electric Company maintained an attitude of neutrality toward the workers' groups throughout the course of our negotiations, and not only made it unnecessary for the board to hold a hearing and enter into litigation of any nature, but went far beyond in extending every cooperation to the government agency established under the Wagner Labor Relations Act. I cannot too highly commend the attitude and actions of the General Electric Company in this connection.

"In no other election conducted by the National Labor Relations Board has so high a percentage of the eligible voters participated. In the recent election conducted by the board in the RCA Camden plant, a large number of workers refrained from voting. In the General Electric election 95.9 per cent of those eligible to vote cast their ballots. The spirit of fair play was such that the board, contrary to its usual custom, held the General Electric election in the plant itself.

"The attitude of the company, as typified by Messrs. Gerard Swope, president, and W. R. Burrows, vice president, and the two workers' groups involved has been maintained on such a high level as to augur well for the future of harmonious labor relations in this huge industrial enterprise. There would be no work for the labor board if in other situations where the right of workers to bargain collectively through representatives of their own choosing arises, the same high standards of fair play and willingness to abide by democratic procedure obtained.

"This election which resulted in the majority choosing the United Electrical and Radio Workers of America as their collective bargaining agency is a landmark in industrial democracy."

Employers and Employees who are Inexperienced in Group Negotiations are Largely Responsible for Present Industrial Strife.

Reactions *of* Employees

NOTES ON PANEL DISCUSSION
Participants: C. S. Slocombe, T. E. Torrance, T. North Whitehead, H. A. Wright

THE present unrest which effects large areas of American industry today can best be understood against background of conditions which have developed over the last 5 years. At the bottom of the depression workers were obliged to submit to wage cuts, long hours, and other poor working conditions, and dare not make any substantial protest for fear of losing the jobs which they had. Section 7a of the N.I.R.A. was a method proposed by the government to return to them some of the spirit of independence which they had previously held. It was hoped that this Act would appeal to them because it proposed that by their own efforts, combination, and organization, workers should be able to improve their own wages and working conditions. But the Government failed to appreciate the fact that employees who are unskilled in working together in organizations cannot suddenly learn to do so, and that employers who are equally inexperienced in negotiating with groups of employees cannot suddenly learn to do so.

Employers widely extended the use of so called employee representation plans as providing a means of employee organization with which they thought they could most easily deal. Employees, having no experience of trade unionism and being suspicious of it, in many cases, welcomed the organization structure provided by their employers in these plans. But the setting up of such structures while it minimized, did not avoid the difficulties caused by the inexperience of both parties in conducting negotiations.

The session on what employees want attempted to throw some light upon the difficulties caused by this inexperience and some of the facts which students of the subject have found to be the habits of thought and motivations of employees. The conference did not attempt to give a list of things which employees want such as fair wages, reasonable working conditions, security etc. In the early discussions of the panel this question was raised. But such wants seemed to be so common that it was thought unnecessary to discuss them in the open forum and it was decided that the meeting should rather consider the more abstruse and hidden wants of employees.

Incentive Plan Suspected

A case was cited of a group of employees of varying age and experience working under a group incentive plan, by which the total output of the group was theoretically divided among the members of the group in accordance with the amount of work each did. On studying the matter the company found that older employees who were slowing up were not contributing as much to the work of the group as the younger men. They therefore proposed that the older men's rates should be reduced in order that the younger men's rates might be raised. This seemed to the company to be a desired modification of their group incentive plan which would appeal to the employees because each man would be paid more nearly what he was worth.

The employees through their representatives immediately protested this scheme. The company in the usual manner proceeded to prepare an elaborate set of charts and figures on output and wages to demonstrate to the employees the fairness of their proposed new wage scales. In this the company was thinking in logical terms. They had made a proposition which seemed to them to be logical, the employees had objected to it, so they proposed to add a little more logic in order that the employees might accept the plan.

But fortunately the matter was studied more thoroughly and the attitudes of the employees looked into more fully to see just why they objected to this apparently fair change. Various matters were considered such as; were older employees in the control of the representation plan? If so, did they not want their status changed even if it worked hardship on the younger members who might not be so fully represented? did the younger members in the group object to the change, even though it worked hardship on them now, because they looked forward to a time when they themselves would be older and slow up? did they want to ensure that, even though while young they might not be fully paid for their work, when they were older they would have some sense of security?

No Change in Policy

Did the employees think that the scheme really involved a change in company policy, in which the recog-

nition of the value of age and experience and long service would be lessened in value in the eyes of the company. These and other considerations led the management to throw away their charts and statistics, and talk with the employees to find what their real objection was. When they did this, they found that the employees suspected the company of changing its wage policy in the direction of adopting the idea that employees must maintain their efficiency independ ently of the length of time on the job.

This would mean that the company would disregard entirely those intangible factors of value of a long service employee, such as his knowledge of company policy and practices, the way in which he fits into the scheme of things, his stability, etc. Management through interviews found that this was their real objection to the proposed changes. However, employees saw the fairness of their company's position, in that it could not be expected to carry a man indefinitely whether he did his work well or not, and that there must be some relationship between wages and output.

The matter was finally adjusted by the employees withdrawing their objection, only stipulating that there should be 90 days notice of each individual change and that each change should be discussed with the employee concerned to ensure that he was given a chance to bring his output up to standard rather than have his rate reduced.

This case was quoted to illustrate that (a) the method of dealing with employee's protests or objections to management proposals by means of logic is too elementary, (b) that there may be many reasons for employees' protests against management's proposals, and it is only sensible for management to try to find out which of the various possible reasons is the one actually motivating their employees in any given case, and deal with them on the basis of their real reasons for objecting and (c) it suggests that, if the employees are overcome by either logic or superior negotiating ability, and forced to accept a position, while the real reason for their dissatisfaction is not met, that although they may acquiesce, their dissatisfaction will remain.

Why Always Suspicion

One of the less obvious, but more simple, factors brought to light in this case is the fact that as soon as the company proposed to make a change the employees were suspicious. (This matter was not stressed by the conference.)

Why is it that that most common and recurrent reaction that shows up in employee representation negotiations in almost every company is this suspicion of management by employees. This must be routed out, if there is to be hope of allaying unrest. On discussing this matter with an executive he quoted a recent case in which he had negotiated with his employees an agreement whereby employees working on 40 hour, 5 day week, were to be allowed time and

a half for work on the 6th day and double time on the 7th day whether the 6th or 7th day came on a Saturday or Sunday or not.

The employees in the negotiations brought up every conceivable possible operating condition which they thought management might quote as an exception from this agreement. This of course was excellent negotiating practice on the part of employees for many quarrels arise simply because in agreements all the possible exceptions and conditions which arise through the emergencies of operation are often not thought of, and incorporated.

Finally the executive asked the employees why they were bringing up all these various possible emergencies, and assured them that so long as he was an officer of the company they need have no fear that the company would attempt to quote emergencies, unexpectedly large demands or other excuses to abrogate or nullify agreements in particular instances. It was a policy of the company to be fair to its employees, and not attempt to chisel them in any way. Two months after this negotiation took place the plant superintendent in one division of the company had an extra rush of orders. Minutes of the meeting covering the agreement had been sent to him. But he started to work his men on 6th and 7th days, which were not Saturdays or Sundays, and declined to pay overtime in accordance with the agreement negotiated in the head office, on the grounds that it was an emergency not provided for in the agreement.

How to Avoid Suspicion

Such cases are only too common, and while they continue the suspicion of employees is continually being aroused, and kept alive. Employees want rather to be able to feel that when management agrees to a proposal it will be lived up to 100%.

There are two ways of minimizing the chances of such occurrences. (1) Employees should be encouraged, in negotiations, to bring up all reasonable possibilities and exceptions which might arise in actual working practice, to make sure that the coverage and understanding is as complete as possible. This would be a better practice than asking employees to depend upon the integrity and sincerity of management. (2) Conferences with employee representatives or other employee groups should be paralleled by conferences with district or divisional management officials. They should be called together after agreeements, to have the terms thoroughly and completely explained to them, and to have the basic policy of management as to fairness, sincerity, etc., reiterated.

Such a practice of duplicating conferences of employee representatives with conferences of local managerial officials is rare. That fact that it is not done is evidence of the inexperience in negotiating with organized employees.

Words Have Two Meanings

The next question which was brought up was that of the interpretation of language used by employees. A speaker mentioned being at a dinner party, in which a lady was very emphatic in her wild statements about what brutes Englishmen were as husbands. The lady told of their impoliteness, lack of consideration, snobbishness, and so on. These were the words used by the lady, and might have been taken as facts regarding Englishmen. However, he happened to know that the lady was in the process of being divorced from her English husband and she was really talking about the particular gentleman with whom she had quarreled.

The obvious things of which men speak are not necessarily what they are really talking about. There was, for example, a case in which employee representatives demanded that employees have the right to elect their own foremen. One representative after another cited instances of the oppression unfairness and disregard of workers desires by foremen, in backing up the arguments for the election of foremen. Management representatives were clever enough to get employee representatives to agree that 95% of foremen did their job well and were liked by the workers, and to show them that what they were really talking about was the other 5% of inefficient foremen. The request for the right to elect foremen was then dropped.

Management, of course, having defeated the employee representatives on this point took no steps whatever to see that the 5% of foremen who were trouble causers were either educated and trained in the art of foremanship or were transferred to other work. Hence through their inability to state their case properly, employees failed to get what they wanted, namely the improvement or elimination of poor foremen. So a cause of dissatisfaction remains.

Myths and Distinctions

This reaches over into another consideration. Management assumes and acts as if employee representative really represent the body of employees. It says that if matters brought up by representatives do not represent the views of employees, plans have provisions for the recall of representatives, and that therefore they must deal with the matters which representatives bring up. While this is a sound theoretical position, and in accordance with the structure of representation plans, it really means that often management is negotiating with a myth. It is therefore necessary for management to look through propositions submitted to it, to what employees really want.

The conference next considered the point that the worker seems to desire the same privileges as his boss. This was answered by an interpretation of the present industrial situation. The rise of present large factories increases

the gap between those at the head of the organization and workers at the bench. In small organizations this gap is small. The problem then in large organizations is to develop a continuous series of levels or hierarchies, from the worker at the bench to the boss at the top, and to make sure that in this series there are no unnecessary aggravating distinctions. For example, even such a small thing as the boss's using linen towels to wipe his hands, whereas the workers are given paper towels was quoted as a species of unnecessary and aggravating social distinction.

It was agreed that levels or groupings must be continued in industrial organizations, and that there must be some distinctions between them. It is desirable, however, to see that there is not too great a jump from one level to another, and that there is sufficient mobility between levels. That is to say, there should be a sufficiency of opportunities for persons at each level to advance to the next level. In this way individuals who are particularly conscious of social distinctions have reasonable opportunities of gaining them.

No Economic Men

The next and final point considered was the tendency to distinguish between the individual and social psychology of workers. It was said that no such distinction exists.

A foreman or an executive may deal with an individual worker, praise him, treat him unfairly, promote him, or demote him. But it is not an isolated individual worker who is being so treated. It is a member of a group. The worker knows that he is a member of the group and accepts or rejects management's actions in regard to himself, always considering its effect on his status in the group. The group correspondingly watches carefully to see that the action is in conformity with their unwritten social code.

The conclusion reached by the conference from these considerations was that management should cease thinking of a worker as an individual "economic man," who is always trying to get as much as possible for as little as possible, and who sometimes gangs up with others similarly motivated. It should turn its attention to the social structures developed by employees inside the plant, and try to understand their nature. Then will management be on the way to deal with the realities of life, instead of with an accumulation of non-existent logical "economic men."

There is no Relationship Between Labor Costs and Gross Receipts Under a Rigid Price System Operating at a Profitable Rate.

Labor Costs *and* Administered Prices

By Charles S. Slocombe
Personnel Research Federation

This is the second of a series of articles on bases for employer-employee cooperation.

The need for some sort of economic and statistical advisory service exists today particularly in those industries and corporations in which prices are "administered" rather than determined by open market conditions.

The classical economic theory of a large number of small independent units competing with each other for the market, and reducing their prices to somewhere near their costs, because of the competition of their neighbors, still operates over a large part of American business and industry.

But in certain branches of industry, particularly where there are only a few large companies who can so to speak dominate, if not fix the price, the price is said to be "administered." There need be no monopoly, nor need an administered price system be regarded as a social evil unless the administration produces harmful effects.

U. S. Steel

Let us study the operations of the U. S. Steel Corporation over the past twelve years to see how an apparently administered price system works. We assume administered prices because of a lack of close correspondence between costs of production and prices charged. Below is Table I, showing the relation between production in millions of tons, and cost and average price per ton. It will be seen that as output increases from approximately 4 mil-

TABLE I

U. S. Steel Corporation. Cost and Prices in relation to Output, 1924–1934

Production (millions of tons)	Cost per ton (dollars)	Price charged per ton (dollars)	Year
3.97	81.5	66.2	1932
5.80	64.6	60.0	1933
5.90	68.4	66.2	1934
7.67	66.8	64.1	1931
11.52	60.7	72.8	1924
11.62	59.2	66.0	1930
12.99	54.2	67.0	1927
13.88	56.3	69.4	1925
13.97	50.6	65.3	1928
14.29	54.1	69.2	1926
15.23	51.3	64.3	1929

The average price charged per ton however shows almost no relationship to volume or to cost of production per ton.

These facts may be seen more readily in Chart 1. In preparing this chart, prices for approximately equal quantities, (5.80 and 5.90), (11.52 and 11.62), (12.99 and 13.38) and (13.97 and 14.29) were averaged to smooth the curves.

Here is a striking ocular demonstration of administered prices. While cost of manufacture drops

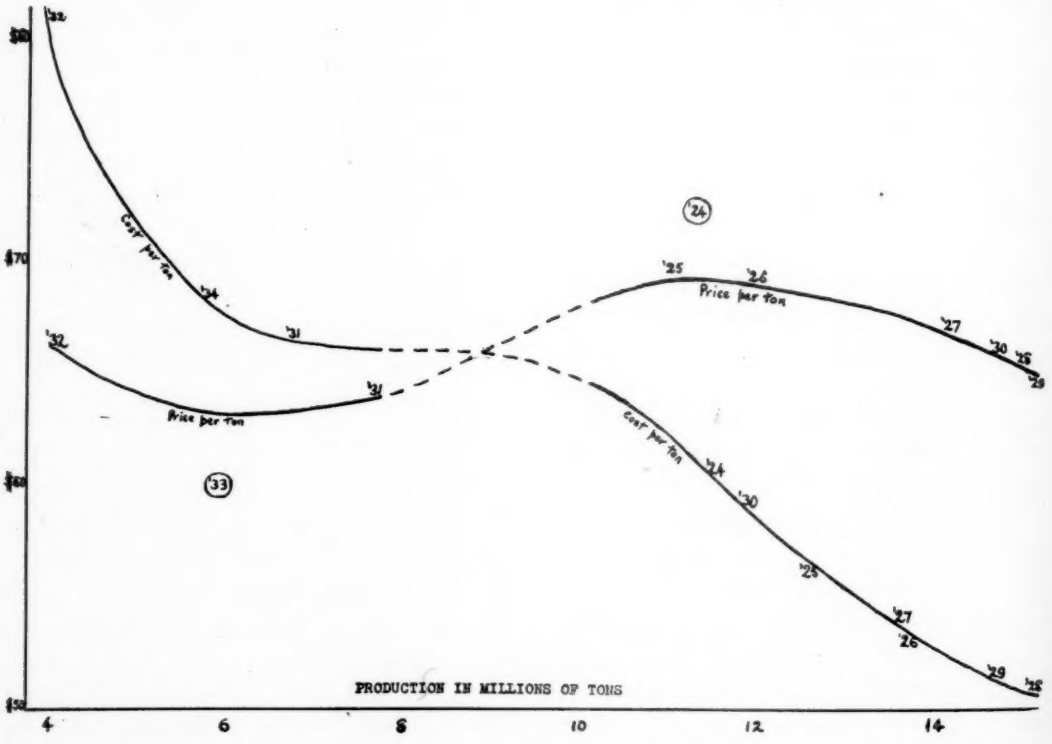

Chart 1. Showing the Relation between Cost of Manufacture Per Ton and Price Charged Per Ton

lion tons to 15 million tons, the cost of production falls fairly regularly from $81.5 per ton to $51.3 per ton. from $80 to $51, the price charged per ton changes only from $66 to $65.

At the left of the chart, while

production is below 9 million tons, cost per ton exceeds price charged, and operations were at a loss. This of course was during the depression period of 1931–1933.

Cost and price per ton meet in the middle at approximately $66 when output is 9 million tons.

At the right is high and profitable production with prices declining from a high point of $69.5 to $65 as output increased. But the effect of this increased output was to reduce cost per ton from $62.5 to $51.

TABLE II

U. S. Steel. Profit per ton related to Output

Output (millions of tons)	Cost per ton (dollars)	Price per ton (dollars)	Profit per ton (dollars)
15	51	65	14
14	53	67.5	14.5
13	55.5	68.5	13
12	58.5	69.2	10.7
11	62.5	69.6	7.1

If we consider high production, of from 11 to 15 million tons, we find a profit position like this (Table II).

As output increased 27.3%, from 11 to 14 million tons, profits per ton increased 100% from $7.1 to $14.5 per ton. Profit per ton declined slightly when production was increased beyond this point.

The combined effect of increasing the number of tons produced at an increasing profit per ton can be seen in Chart 2.

To the left with low production, operations are at a loss. We observe how close together the two lines are, showing how the company minimized its losses.

Costs and Profits

To the right from the point where the lines cross, as production increases the cost and sales lines increasingly diverge. From the 9 million tons output point where costs and sales receipts are the same at $600 million to an output of 15 million tons, the cost rises only $150 million but receipts from sales increase $380.

Again considering this from the profit position, as output rises from 11 to 15 million tons we see what happens in Table III.

TABLE III

U. S. Steel. Total Profit related to Output

Output (millions of tons)	Cost × output	Receipts × output	Total profits (millions of dollars)
15	765	975	210
14	743	945	202
13	721	890	169
12	702	830	128
11	687	766	121

While output increased 36.3%, from 11 to 15 million tons, total profits increased 73.5% from $121 million to $210 million.

In Chart 2 we also show labor cost in relation to output. At the lower end to the left, with low output the labor cost line runs fairly close to the sales line. But as production increases and becomes more profitable the labor cost line runs more nearly parallel in general to the total cost line, and bears little relationship to the sales line. As the point of highest production is approached, labor costs go down, while both total costs

and receipts from sales are still going up.

Thus at 4 million tons output the spread between sales and labor costs is $130 million, at 9 million tons this increases to $250 million, and at 15 million tons it is $560 million.

This shows the well known fact that during low production periods, as during a depression the relative return to labor increases, in proportion to sales. And just as the tendency to reduce labor return, as a proportion of gross sales, under high production, eventually brings depressions, so also the tendency to increase proportionate labor return in low production periods of depressions aids return to prosperity.

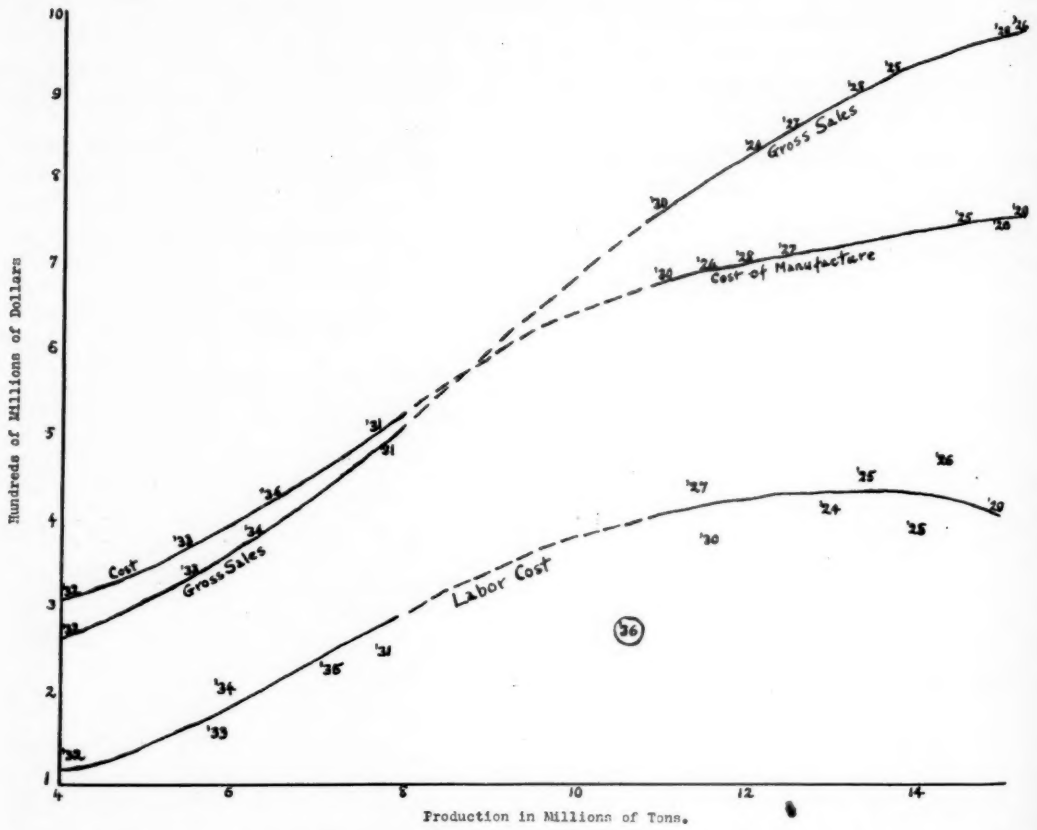

CHART 2. SHOWING THE RELATION BETWEEN RECEIPTS FROM GROSS SALES, COST OF MANUFACTURE AND LABOR COST

Fixed Price Policy

The problem of price administration by such a corporation as Steel is then to do it, in such manner as avoids the constant swinging of its costs and prices lines up and down in inverse directions about a pivotal point.

Moulton in his conclusion from the Brookings Institution study says that prices should be reduced as a means of increasing demand, purchasing power and raising the standard of living. In these curves of administered prices, it is very difficult to see what effect the price policy of Steel has had on demand, because the policy has generally been to keep prices relatively constant, or to move them only within a comparatively narrow range.

From 1924 to 1929 prices were generally reducing slightly and demand was increasing. But were prices reducing fast enough to keep up the demand? Was there any index that the directors of the Corporation could have used to guide them in determining the best prices? Could prices have been adjusted so that they bore a suitable relationship to some index figure such as national income growth, or return to labor, or total cost of manufacture? If this had been done would demand have expanded, and a contribution made towards a balanced national economy?

The only piece of evidence we have on the relationship of demand to price is the fact that, from the worst depression year, 1932, to the next year 1933, Steel reduced its price per ton from $66.2 to $60. This was the greatest reduction in price from one year to the next, and was also the lowest price per ton in our period of survey. Demand jumped 1.83 million tons, the greatest increase in our period of survey. And though labor cost per ton was almost at its lowest, being only 50 cents above similar 1929 labor costs, the total return to labor also jumped. This is hardly conclusive evidence of an elasticity of demand for steel, according to price policy, but it does give cause for thought as to the possibilities that might occur with a less rigid price policy.

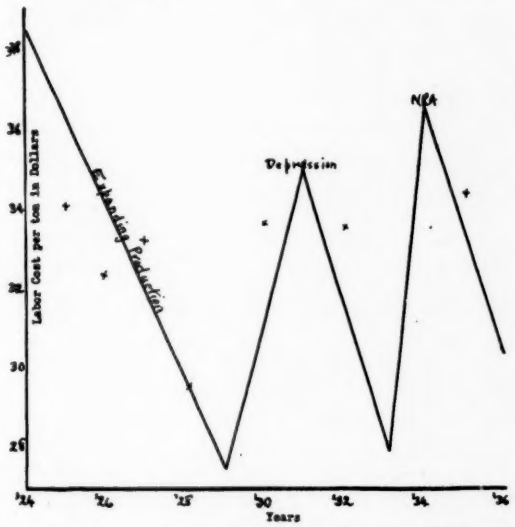

CHART 3. SHOWING VARIATIONS IN LABOR COST PER TON

Though in 1933 operations were at a loss, the reduction in price mentioned above so stimulated demand that losses were not out of line with those of other depression years. (See Chart 2.)

Costs by Years

We have discussed this question of administered prices, which bear no relation to cost of manufacture and shown charts purely in relation to output, and only incidently have

concerned ourselves with the particular years involved.

This was because except for two years (1924 and 1933) prices remained very nearly constant.

A study of labor costs per ton by years does however show some rather interesting and informative things.

In Chart 3, we show the fluctuations in labor costs since 1924. During the period of general expanding production from 1924 to 1929, the period of advances in engineering and management methods, there was almost continuous reduction in labor cost from $38.4 to $27.5.

Then when the depression came, labor costs went up and remained at between $33.5 and $35 during the 3 years 1930–32. In 1933 labor costs were cut back to $28, almost as low as they were in the year of great production, 1929.

In 1934 with the NRA reduction of hours, which involved some increase in hourly rates, the labor cost per ton of steel shot back up to $36.6, almost as high as it had been ten years before in 1924.

This however lasted only a short period. The Steel Corporation as all such companies do, proceeded to increase its technological improvements and improve its management methods, so that by the first half of 1936 it had cut back labor costs to $30.4 per ton, with production only at an annual rate of 10 million tons.

This analysis of the past operations of the U. S. Steel Corporation shows how in the price system prevailing (a) there seems to be little relationship between costs, prices and profits, (b) no consideration appears to have been given to the problem of considering labor as both a cost item, and as a consumer factor.

We suggest that if the national economy is not to be thrown out of balance again, and if labor dissatisfaction is to be allayed, these items should be matters of research by the U. S. Steel Corporation, and similar dominating companies.

In the next issue the operations of industry as a whole will be discussed.

An Educational System Which During the Last Twenty Years Has Supplied Annually Hundreds of Trained Men for Skilled and Semi-skilled Departments.

Ford Apprentice Training Courses

By Frederick E. Searle
Superintendent of Ford Schools

A little group of young men employed in a tool room, realizing that they needed a better knowledge of mathematics and drawing in their work, organized a class in 1913 which met regularly in the attic of one of their number, who acted as both host and instructor.

From this small beginning Ford Motor Company has developed an educational system during the last twenty years which annually supplies several hundred trained men for its skilled and semi-skilled departments. Young boys finishing grammar school, high school graduates, or employees ambitious to learn a trade are given their chance to train for advancement.

Three Schools in Training Program

Since 1915 *Ford Apprentice School* for developing skilled mechanics and specialty men has been continuously operated by our company.

In October 1916 *Henry Ford Trade School* opened with six students. This school occupies Ford Motor Company property but it is in reality a private school incorporated under a Michigan statute to do business on a non-profit basis.

As graduates of this school comprise a large majority of those attending the Apprentice School, a description of its operation is in order.

Boys are enrolled between the ages of 12 and 15. At 18 or 19 they are graduated and offered jobs in Ford Motor Company.

The school is operated on the co-operative basis, the first of its kind for young students.

Seventeen hundred are now enrolled. Until the academic course is

completed, one week is spent in class work and the following two weeks in shop work. This work is segregated and three acres of floor space is set aside for its exclusive use.

During the summer each boy under eighteen is given three weeks vacation and one additional week at Christmas. This arrangement provides 14 weeks of class work, 34 weeks of shop work, and 4 weeks vacation. During all these periods the student is paid a cash scholarship which is set at 15 cents per hour when he is enrolled and is adjusted eight times a year according to his accomplishment. The maximum rate is now 60 cents.

An additional two dollars per month is given each boy for deposit in some bank as a thrift account, and a hot lunch is furnished each noon without charge. In 1935 these three items totaled one million dollars, an average of nearly $590 per student.

School Self Supporting

To justify this expense all work done in our shop is productive. The younger boys are repairing small tools. Safety goggles—ten to fifteen thousand of them per month—can be repaired by the younger boys.

All of the precision tools of Ford Motor Company are repaired by boys who have had more experience—each month 350 pairs of micrometers, four thousand dial indicators, and other items in proportion.

The older boys are engaged in the manufacture of tools—cutters, reamers, drills, arbors, special tools, anything that any good tool room might be called upon to produce.

Last year our sales to Ford Motor Company aggregated $1,700,000 which provided, except for a few thousand dollars, sufficient income to operate the school. This was possible as no charge was made for the floor space occupied and only the depreciation on the equipment loaned to our school.

One man is given the task of routing the boys through the shop so that they may have as varied an experience as possible in many of the twenty-five departments. Boys who are adapted to tool making should have received the following machine training. Shaper 3 months, Lathe 4 months, Miller 5 months, Grinder 5 months. It is evident that boys who graduate at eighteen with this experience are well on their way to become mechanics. Some idea of the quality of their work may be gained by the fact that spoilage on fine tool work involving accurate dimensions in many cases from 0.003 inches to 0.0001 inches, and finer, has averaged less than one per cent for the last five years on an annual output in excess of one million hours.

Practical Training

The method of instruction makes it possible for a boy to enter our shop the first day and on some simple task begin immediately useful work with very little explanation.

Ordinarily fifteen boys or less are enrolled in any one day. One third of this number is assigned to class

work leaving a maximum of ten to be absorbed in the shop. Because of the great variety of work a given instructor would probably have not more than two of these to initiate.

Every day a few boys are transferred to other tasks. This rotation of occupation is in the hands of a single man who devotes all his time to the task. This man is a mechanic, not merely a clerk, and therefore better able to determine when the boy should be given new work.

After a student has become accustomed to shop routine, two conditions make entering a new department less difficult. Boys who are keen observers absorb much from their daily contacts with neighboring departments, and during the class week one hour each day is spent in Shop Theory where shop methods and problems are discussed.

Ingrained in human nature is a desire to do and to discover and within limits of safety this desire is fostered in our shop.

The first emphasis is put upon safety. When entering each department a boy is given a short talk on safety and printed instructions on safe practices in that type of work. Order and neatness are also stressed, and accuracy.

The element of time comes next for that must be considered early in the training process to be most effective. Some boys have ideas which are in part original. Encouragement is given them.

Academic training is closely correlated with the shop work; Mathematics through plane geometry, Shop Theory, Mechanical Drawing, English, Physics, General Chemistry, Qualitative and Quantitative Analysis, Metallography, Civics, Economics, and Geography. Students who have completed this course and wish to graduate from high school or enter college must supplement the work with courses in at least three subjects for one year. Many who have entered college under these conditions have successfully competed with students who have finished college preparatory courses.

Ford Training School

In June 1935 Ford Motor Company opened *Ford Training School* for 200 high school graduates between 18 and 20 years of age. The primary object is to give boys who wish industrial work an opportunity for a brief training before being transferred to a permanent location.

These students receive $22 per week and are given experience on typical tool room work suited to their ability.

The arrangement provides an opportunity to enroll 800 recent graduates of high schools annually. They are absorbed by the Ford Motor Company in almost every department of its activities.

Those who show ability to do such work may be placed in our tool rooms as apprentices when there are openings.

From these two schools come most of the additions to *Ford Apprentice School*.

Class Room Training

All apprentices must attend the class work provided by the school.

Any Ford employee may attend classes for which he is prepared but only apprentices receive the shop instruction.

Classes are held at 8:00 each morning, and at 1:40 and 4:00 each afternoon. This makes it convenient for employees to attend classes without losing any shop time or making an extra trip to the plant. There is no charge for these classes nor are the students paid while attending them.

Apprentices in our tool and die rooms, electrical department, heat treat department, and power house now number 1600. An additional fifteen hundred non-apprentices are also attending our classes hoping for advancement.

The plan used in the class and shop training requires a comparatively small number of instructors for the class work and shop instruction.

Twenty men are needed for teaching the academic subjects and keeping the records, and seven men devote their time to shop instruction and supervision.

Not only are these seven men who have direct charge of the shop training of apprentices skilled mechanics but the class room instructors are also capable of holding positions of responsibility in our shops. During the summer vacation these men work in our shops so that they may more accurately keep pace with the rapid changes and advances in manufacturing processes and precision work.

Tool and die apprentices report for one period in drawing and one in mathematics each week until the prescribed course is finished. This ordinarily requires three years in each subject.

The following method has proved quite satisfactory. Seven lessons are given in mathematics. The instructor spends the class period in demonstration, solving problems on the blackboard, and in answering questions. This demonstration work is aided by charts prepared during the summer vacation.

Examinations

The week for the eighth lesson is devoted to written examinations in all subjects. If the student has a passing grade of 70 he enters the second series of seven lessons. If he fails it is necessary to repeat only the seven lessons. The plan has prevented many students from becoming discouraged.

At the end of each class period home work is assigned. A report must be made on this work at the next class period.

Because of the close correlation with the shop there is never a necessity of explaining to the apprentice the reason for the required class work. Almost from the first lesson there is an immediate application of some principle.

One of the early lessons in Mechanical Drawing requires the student

to reproduce in molding clay the solid represented by the three surface drawings. The cutting is done with a tool made by substituting a wire for the saw in a small scroll saw frame. This practice helps to make reading of blue prints rapid and accurate.

Our class work in Electricity deals not only with the theoretical but much laboratory work is given. With the help of an adequate switchboard one side of which is wired for alternating currents adjustable up to 4000 volts and the other side for direct current from 230 volts down we can duplicate many of the problems which arise in our company for which moderate voltages are used.

For apprentices in our various laboratories and heat treat departments the class work in Metallography also gives much work of a practical nature. Many of the problems arising in the factory that require a microscopic examination are referred to this department for solution. The student is therefore challenged by the fact that polishing of samples, etching them, and preparing them for the microscope is purposeful and plays its part in producing more nearly perfect material.

Shop Instructor and Apprentice

Shop instructors have full control of the apprentice during his training period.

The instructor assigns the student to his first task, sees that he has work to give him progressive training, transfers him to other types of work, keeps a record of his work in both class and shop, and recommends him for pay increases according to his progress.

In our training program the shop instructor is the key man. He is in daily contact with each student and these contacts are usually with the individual alone. He comes to know him more intimately than a class instructor who meets him only once or twice each week possibly can.

The first day a new apprentice reports to a tool or die room he is interviewed by the shop instructor. Whether he is a graduate of Henry Ford Trade School or Ford Training School, or comes with no previous experience he is given oral and printed instructions on safe practices in the work to be assigned him.

He is then taken to the department in which he is to work. The foreman of that department is called a leader, who selects the work for each of the twenty or twenty-five men who work under his direction. Several of these men may be apprentices at various stages in their training.

The shop instructor shows the apprentice as much as may be necessary about the machine he is to operate. If the student is not familiar with the machine he sets up the job, sharpens and adjusts the tool and makes the first cut, which in the case of the lathe may be a facing operation. The machine is then turned over to the student who makes a cut with as little help from the instructor as possible. Beginning with his first

job every completed piece must be checked by the department inspector for size and finish.

For whatever time may be necessary the instructor remains with the student until he has mastered the operation and he continues that same type of work until another job has been assigned by the instructor. If any questions arise during the instructor's absence the leader or a nearby workman gives the required assistance but all initial explanations or those involving considerable time are made by the shop instructor.

Machines in Course

While we consider the natural order of training in a tool room to be shaper, lathe, miller, grinder, and bench there is no fixed rule of sequence. We prefer to start a student with shaper or lathe experience. Sometimes it happens that the machine for which a student is ready is not available in which case another is substituted, but before the shop training is considered complete he should have had a minimum of six months on the shaper, eight months on the lathe, nine months on the mill, eight months on the grinder, and nine months on the bench. Even this schedule is subject to considerable variation depending on the skill of the student. In any case the shop instructor is primarily the one to determine what part of the training may be shortened and what extended.

The regular work coming to the department will ordinarily in the course of six months furnish a sufficient variety to give the student an experience which would warrant considering his training finished in that department.

Of course the school and apprentice both realize that further experience on the lathe would probably result in a greater skill and greater dexterity and that it would be desirable before the individual could be considered a lathe specialist.

Upon completion of the training period on one machine to the satisfaction of the shop instructor and shop leader, the shop instructor requests an increase of five cents per hour in the pay rate of the apprentice, who until this time has been receiving the Ford minimum rate of 75 cents per hour. This request is presented to the Director of the Apprentice School who approves it providing the student has maintained a satisfactory record in both his mathematics and drawing. When this has been properly endorsed by him and the school Superintendent the form is forwarded to the pay roll department of the factory where the new rate is made effective.

Records Kept

On the day an apprentice is placed in a department the shop instructor makes a note of the date and sends the information to the Director of the Apprentice School who fills out a form card which is so dated that it will rotate in the file and come to the top on the date when the student should be ready for transfer. If on account of sickness or for any other

reason the transfer should be delayed the notation is made and the card set for the new date.

This double check makes it very unlikely that a student can be overlooked at transfer time. The final decision for transfer rests with the shop instructor and not the shop leader, whose personal interest would be better served by delaying the transfer.

For the other standard machines found in the tool room; shaper, mill, and grinder, the same routine is followed and increases are given at intervals of not less than six months to a maximum of 95 cents per hour on completion of the course.

Certain special machines such as Lucas boring mills and Csip mills are few in number in any tool room and only a few of the more skilfull apprentices have an opportunity to operate these machines.

When the student has completed his course he is given a card stating what experience he has had which entitles him to be considered a journeyman. From this time he is placed where he is considered to be most valuable to the company.

Construction and Maintenance

Electrical apprentices are treated in a different manner as in most cases the electrician must go to his job, while the job usually comes to the tool maker.

An electrical journeyman takes an apprentice with him. However, these assignments are made by the shop instructor, who visits all apprentices at frequent intervals. The journeyman explains to the student the nature of the job confronting him and calls on him for such assistance as he can safely render.

Much care is taken by the journeyman and the shop instructor to explain the safe methods of handling installation and maintenance work.

As the shop instructor visits the apprentice on the job he encourages him to talk about his work, and to ask questions, which are answered as completely as his previous training will permit.

By the time the apprentice has completed his theoretical work which he receives twice a week over a three year period he is able to understand most of the problems that he encounters in the work of manufacture, installation, and maintenance.

No apprentice is kept long with one journeyman. The shop instructor changes him frequently for the purpose of broadening his viewpoint and giving him a chance to observe the different technique of journeymen. It serves as an incentive to make an improvement in his own methods.

There is also a reaction on the journeyman who is acting as a teacher as the surest way to master any subject whether it be purely academic or a mechanical skill is to teach it to another. In this way the presence of apprentices serves as a tonic to any department.

Many a journeyman has also been

spurred to new effort by observing apprentices not only approaching his skill but surpassing it by the introduction of new methods.

No tool room or other shop department that has a considerable number of apprentices who are welcome in that department can stand still. Apprentices return their cost in an immediate step up of the department in which they are placed.

Check a tool room in which there are apprentices who have completed their mathematics and drawing and you will find journeymen taking new problems to them for solution.

While the shop instructor is the key man, in a smaller institution he might well be the only man required to train a limited number of apprentices, as he could undertake the class work as well as the shop supervision.

Textbook Material

From the beginning of our training program suitable text material was hard to find, and special lesson sheets were compiled by our instructors. At first these were few and without much sequence. With the growth of classes, better organized courses became necessary.

The original plan was to distribute mimeographed sheets during the class period. With the accumulation of material and because of many requests for copies for use in other schools it became necessary to bind them in book form. They now contain the teaching material used in our mathematics, drawing, electricity, metallography, and science departments.

Their preparation has brought the theory of class closer to the facts of the shop for both student and instructor.

Five Years Ago a Young Man Was Near Dismissal Because of Bad Habits. But He Was Retrained and His Nervous Health Improved. He Has Been Promoted Five Times and Received Six Increases in Pay.

Nervous Health *in* Industry

By Lydia G. Giberson, M.D.
Metropolitan Life Insurance Co.

At the outset I would like to explain that I am not appearing as a special pleader for the cause or place of the psychiatrist in the industrial group. I prefer to present to you, ladies and gentlemen, the facts as briefly as I can and let your intelligence draw from them any conclusions beneficial or constructive to personnel officials.

In the first place I am a physician. It is well to bear in mind, in anything I may say subsequently, that my approach to personnel problems is primarily a medical one. The degree of my success or that of any other psychiatrist is an ability to make an honest medical training serve the needs of mental hygiene in industry.

There is no mystery to the job of psychiatry. There is nothing of long medical terminology designed to impress. It is simply a humanitarian, common sense attack of a known problem with a time honored perogative of the doctor thrown in to bolster confidence on the part of the harrassed employee. For these perogatives are important as they provide the employee with a company sanctuary, a spot where individuals may come to pour out their heartaches and discuss their problems. They realize these confidences will go no farther, but because of the close association of the psychiatrist and the personnel department, adjustments may be made and troubles smoothed over.

Let me illustrate the work of an industrial psychiatrist by a case.

Example of Rehabilitation

A chap of 27 with a highly intelligent face bearing signs of dissipation referred from the Medical service because of a recent alcoholic spree which numbered the fifth of a series and which should mean exit from the company. A most amazing history of a twisted childhood due to the elopement of a girl of social position and wealth with a railway brakeman. As a child he was battered from pillar to post, one time almost destitute, the next the pampered maternal grandchild. Each parent had extra marital attachments. The patient had many positions. He became enamoured with a girl whose hold was so great over him that he would throw up any job and follow her to the ends of the world. Suddenly after five years of living in a false heaven, the girl broke off all contact with him. His social, emotional and financial status was at a standstill when he obtained a position with this Company. After a few months he suddenly and unexpectedly ran into this girl with whom he had always been so much and so hopelessly in love. His world tottered and he decided a good spree would suffice, so each time his fits of depression overtook him he sought oblivion through alcohol with resulting gastrointestinal upsets, etc., and greater depression, which soon became a vicious circle. The situation seemed difficult but not hopeless. The chap was intelligent and he could be given insight as to why he acted as he did. A conference was held with a personnel officer and rather reluctantly it was decided to give this chap one more chance, letting the responsibility of success or failure be laid squarely at the psychiatrist's door. Patient hours were spent with this chap. At times it was difficult to know who was more discouraged, the patient or the psychiatrist but we fought on.

That was nearly five years ago. The chap, since then, has had five promotion with six increases in salary. He is a completely rehabilitated individual who is doing a grand job for the Company.

Voluntary Patients

Because of the recognition of such facts as these, the Metropolitan Life Insurance Company, in 1922, placed a full time psychiatrist on their staff. Since that time three thousand, six hundred new cases have been seen and approximately fifty thousand interviews granted. In 1935, out of fifteen thousand employees, two hundred and five new patients were examined, seventy-nine of whom were men and one hundred and twenty-six of whom were women. In this company the ratio of men to women is one to two. During the same year there were three thousand, seven hundred and eighty-nine interviews, independent of the two hundred and five new cases. These interviews cover re-examination of patients, discussion with other physicians regarding the cases, psychotherapy conferences and interviews with supervisors regarding their employees. Each year it is gratifying to see the increase of voluntary patients and the response of supervisors who come unsolicited to the psychiatrist to discuss the problems of their people and to ask help

in trying to maintain emotional stability in industry.

Preclinical Symptoms

Organic neurological conditions and the frank psychoses do not occur like a "bolt from the blue" as is often believed. They are insidious in onset requiring a trained eye to early detect. Pre-clinical symptoms early picked up may save industry much embarrassment and loss in dollars and cents. Consider for a moment the tremendous responsibility of those in charge of public conveyances of all types. The trained neuro-psychiatrist early sees the fixed pupil of the incipient tabetic. If such an individual is left on duty until his lack of co-ordination and muscular control is noticeable to the personnel man, it is often too late. The engineer of a locomotive complains of a lessening of the grip of the right hand. He may speak of it lightly as a sign of approaching age. To the neuro-psychiatrist this is the warning signal of a probable slow leak of the arteries of the brain. If this warning signal is heeded and investigated, the tragedy of a "stroke" at the wheel of his engine is avoided. Imagine an elevator operator or a driver of a truck with epilepsy. How much more profitable to make the diagnosis before the elevator car falls or the truck crashes.

In one of our cases a boy of 20 was referred by his section head for a sudden falling off of work output and loss of interest in his job. There seemed to be no explanation for this condition and dismissal was considered. An appointment was given for the following day. The next morning the patient's family telephoned and stated that the boy had disappeared from home, had not been home at all the previous night. Five days later he was picked up fifteen hundred miles away. Little explanation of his behavior could be obtained. The consensus of opinion seemed to be that the boy was running away from something unpleasant that he had so far successfully kept hidden from his family and the office. After two interviews in the psychiatric department, experience taught that there was probably an underlying organic cause which could best be studied in a sanatorium. The boy was admitted to a private sanatorium and found to be an epileptic. His strange behavior was readily explained. His job which took him up ladders was changed and possibility of accidents lessened.

Company Loss

Again picture for a moment, an official of an investment company with early paresis. It is noted in his company that this individual seems a little different in his viewpoint, is a bit irritable, does not seem as logical as he previously did, but too often the true state of affairs is not found out until the company has suffered a severe loss through the individual's poor judgment or lack of judgment in granting a large loan to a very poor risk.

In the mental breakdown group, a paranoid supervisor, local manager or field superintendent, suffering with a Napoleon complex may subject many

employees to a browbeating almost unbearable, if this man's early condition is not recognized.

It is chiefly among the large group of psychoneurotics that absenteeism, and lessened efficiency with lowered production is found.

Overcompensated Fear

There is no blinking at the fact that rational outlook, freedom from the myriad besetting worries of this vale of tears, or in other words, some approach to that Utopian emotional norm—complete content—makes for greater production. Psychoneurotics are emotionally immature individuals. Many of them translate their disappointments and difficulties into physical symptoms in much the same manner as little Johnny develops a severe stomach ache on the morning that a difficult arithmetic examination is in progress.

The need of proper diagnosis and treatment of such cases is shown in the following case.

A girl of 24 years, referred by Personnel because of her very bad attendance record which was said to be due to medical causes. A very large, ungainly girl arrived with a severely mannish haircut and a mannish mode of dressing. She appeared surly, irresponsive, almost insolent in manner. This was so pronounced that one immediately recognized a cover-up. After much effort the following history was obtained.

A divorce of parents in very early life, with the patient being pushed from paternal relatives to maternal relatives, from boarding schools to convents. Never did the child have a feeling of home security. She was petrified of life. For three years in this company's employ she had been in the section of a very fine woman manager but not an understanding one. Because of her distinctive haircut and dress she was conspicuous and everything she did was wrong. Her insolent outward appearance, covering a frightened and bewildered girl, was accepted at face value. The girl's belief that men were more acceptable in business caused her to adopt the mannish mode of dressing. After a conference with Personnel, the girl was transferred to another section. The new manager was given some insight into the picture. Now after six months, a radiant, entirely different girl is the result. No more lost time, improved work, with increased interest in the task.

To peer behind the scenes into sex troubles, financial embarrassment, domestic clashes and the dozen of other factors which make for emotional upset and consequent loss of efficiency could not, in all fairness, be placed in the province of the personnel worker whose job, heaven knows, is saddled with enough burdens as it is. But that this work should be done in a company is evident from the following curious case.

A girl of 20 years, referred by her section head, because of a "fear of immediate death." The girl denied any trouble at the office or at home. Could get little information at the first interview. The following day the girl came back voluntarily saying she would like to

discuss her problem since she felt the information would not be given to the personnel division. The girl lived with her grandmother who was most irritable and unreasonable. She made the girl's life most unhappy. The patient admitted that she often wished her grandmother dead which was the psychological explanation of her own fear of immediate death. The whole problem was discussed with the girl. Different living arrangements were made through the father and the girl continued at her job. That was several months ago. She has a satisfactory work report now and has had no return of her fears and no loss of time from work.

The reverse side of the picture shows many employees who cry without apparent reason and become irritable and difficult to handle. On superficial appearance the underlying cause is emotional yet with a thorough study of the case, definite physical factors are found, such as anemia, very early tuberculosis, etc.

Psychiatry Helps Personnel

We also find another set of individuals who should be of prime interest to personnel workers. Interesting, because numerically they run higher than other classifications. They are the people we call mal-adjusted. That term, mal-adjustment, demands a little interpretation since it covers a multitude of sins. Mal-adjustment covers the wide range of emotional disturbances caused by any mental irritant, be it that of private or working existence. Any lack of acceptance or adjustment to the many adverse circumstances previously alluded to can be broadly termed mal-adjustment. Since it is the most subtle of the barriers to efficiency it must be carefully considered in employee relations, particularly in those supposedly mal-adjusted to routine jobs. It is entirely conceivable and demonstrable that a potentially efficient person may be wasted in an improper job. In the ironing out of these phases, a psychiatrist may help materially. One finds some employees who do not adjust despite help given them but tend to show personality traits not conducive to efficient work. Among many of the old employees there is no hesitancy in airing their real or imaginary grievances of changes in the organization. Many become trouble makers and sooner or later need to be studied psychiatrically.

To you, ladies and gentlemen, whose first problem is production, with a minimum of labor turnover, a maximum of organization efficiency, I ask you to remember that human beings remain human beings and that the measure of their production is, in the main, the result of their mental contentment and security.

Personnel Work Today Cannot be Performed by an Untrained Person with a Kind Heart and a Glad Hand. It Requires a Professional Training.

Training for Personnel Work

By Harry D. Kitson
Teachers College, Columbia University

I think we would all agree that personnel work has attained the status of a distinct profession comparable with medicine, law, dentistry etc. On what grounds can we make this claim? Let us review briefly the earmarks of a profession.

First, to be classed a profession, a field of work must be represented by a body of practitioners who are held together by a craft consciousness as expressed in formal professional organizations. If any doubt existed regarding the presence of such a psychic bond among personnel workers it was dispelled by the organization of the Personnel Research Federation in 1921. Its statement of purpose as that of "the scientific study of man in relation to his occupations and his education therefor, and the diffusion of knowledge concerning this relation," explicitly recognizes personnel work as a profession.

A second criterion of a profession is the presence of high standards of proficiency. That is, a professional man insists on doing his work superlatively well. When I observe the majority of personnel officers I see that they qualify in this respect.

A third requirement is a strict code of ethics. A professional man permits nothing to stand in the way of the service which he is bound to render. He sacrifices personal wishes and political expediency to the welfare of those whom he serves. In this respect, too, the high-minded members of the personnel clan qualify as professional workers. Their aim is the betterment of the lot of workers and they regard all other considerations as subordinate.

Finally—and now we come to the topic assigned to me—a profession exacts from its practitioners an extended and specialized training. What kind of training should the personnel executive receive?

Industrial Personnel Work

I assume that in the treatment of this topic I am expected only to lead your thinking concerning this problem. I also assume that we are expected to consider only the specialist in industrial personnel, leaving out of account personnel workers in colleges, universities and government agencies. Further I assume that we are not concerned with certain specialized experts who often work in personnel offices, such as nurses, directors of recreation, directors of education etc. In other words with your permission I shall speak only of the training to be offered to the "pure" personnel officer *per se*.

Two further limitations: we shall omit discussion of the personal qualities that should characterize a personnel officer, taking for granted that he possesses the mental, social and spiritual attributes generally agreed to be necessary. Neither shall we include in our discussion the type of business experience he should have before assuming the rôle of personnel executive.

Finally I am going to beg the pedagogue's prerogative of speaking didactically and in terms of academic courses.

I suppose that in claiming professional status for personnel executives we should be able to point to professional schools organized specifically for giving training in personnel work, comparable with schools of medicine, law and dentistry. Regrettably there are none. We can truthfully assert however, that training in personnel work is a legitimate function of a university. And we can find a number of universities which offer elements of a training program. There is no universally adopted pattern for this training. It is variously offered in Schools of Engineering, Schools of Business, Schools of Education, and in separate bureaus attached to universities, such as the Bureaus of Retail Training at New York University and the University of Pittsburgh.

May we agree on the preliminary premise that this training should be on the graduate level; that the trainee should already possess a broad cultural education equivalent to graduation from a college of liberal arts. On this foundation, what kind of structure shall we rear?

In thinking of the personnel curriculum I group its contents under three headings; Understandings, Techniques and Practice.

Understandings

Under this heading are a number of areas each of which demands one or more courses:

Problems of personnel administration. This should be a survey of the important problems faced by personnel officers.

Business management and business organization. Surely the personnel officer

should know what are the problems faced by non-personnel executives in business, so that he can perform his tasks with a sympathetic understanding of the problems which other executives are facing.

Labor problems. Under some such term the prospective personnel officer should study the problems which workers, organized and unorganized, have faced during the transition into a highly industrialized society.

Social legislation constitutes another field with which the personnel officer needs acquaintance.

Psychology. A large area of understanding is covered by this term. It is expected that the personnel officer would have had an introduction to psychology in his undergraduate studies, but for specific professional work in personnel he should study this science further. Not, I hasten to remark, along lines usually pursued by academicians, who utilize categories of theoretical psychology such as memory, imagination, emotion etc. Rather the personnel officer should study psychology in terms of categories such as the mental derangements afflicting workers, the discovery of differences among applicants for jobs, the development of incentives in industrial situations etc.

Techniques

Let us now examine the techniques which should be incorporated in the training program. There is the technique of testing—intelligence, trade, interest and personality traits. While in actual practice this testing should be done by a professional psychologist who may or may not be trained in other aspects of personnel work, the personnel officer should have more than an elementary understanding of the techniques involved.

Again there are clear-cut techniques of job-analysis which the personnel officer should master. Likewise techniques of interviewing, keeping records and making rating scales. Some persons might recommend training in the techniques of working with employee-groups. We should certainly include training in personnel research and in that indispensable tool of research, statistics.

Practice

The courses which I have mentioned must necessarily be theoretical. They should be supplemented by another form of preparation which we may call practice. Most professional preparations embody a practice-period when the individual applies his theoretical knowledge by serving an interneship—a term of apprenticeship when he works under the supervision of persons who have already mastered the techniques. Such a feature should surely be included in our personnel curriculum. This suggests that training for personnel work should be regarded as a coöperative undertaking involving the joint efforts of university faculties and experienced personnel executives. Its feasibility has been amply demonstrated in the training program conducted by the department of Guidance and Personnel at Teachers College, Columbia University. We maintain very happy relations with

many business and industrial establishments which permit our students to apply their theoretical knowledge in practical situations.

Professional Status

In making these recommendations I have proceeded in an empirical manner, suggesting courses which seem to be dictated by best practice and opinion. We should recognize however, that a professional curriculum should not be ultimately based on opinion. It should be derived from extended research into the tasks that the worker has to perform. It is hoped that such research will ultimately be made. Until then we are obliged to proceed by the rule-of-thumb method I have employed.

Some of my listeners may question my assumption that the training of personnel officers must be carried on in universities. They may say "I learned on the job, and that method is good enough for anybody." But the fact that many of the pioneer personnel workers entered the field without specific training does not imply that the oncoming generation should learn by rule-of-thumb. The history of every professional field shows that in its formative period its practitioners learned through apprenticeship but as it developed in complexity and erudition, it crystallized itself in systematic courses pursued under academic auspices. It is not likely that personnel work will be an exception to the rule.

Perhaps, also, you may charge me with holding too high standards of preparation. The ideal course-sequence I have outlined is equivalent to two years of graduate work. Here I am really paying a compliment to the profession of personnel. Rather than placing it on the level of office-boy or general clerical work, to be performed by anyone with a kind heart and a glad hand, I am elevating it to the status of a profession. Further, I am classing it with the humanitarian callings such as medicine, social service and education, which society deems most vital to its well-being and of which society exacts rigid standards. The state demands evidence of proficiency from plumbers, barbers, beauty-culturists and chiropodists. But no standards exist for personnel officers, whose work affects so vitally the welfare of human beings. The best way to invest our profession with the dignity and prestige which it should command is to insist on rigid standards and a thorough professional training.

New and Revised Tests for Assembly Work, Bench Work Dexterity, Mechanical Intelligence, Mental Alertness, Have Been Developed during the Past Year.

Testing *for* Aptitudes

EXTRACTS FROM PRESENTATION
By WALTER V. BINGHAM
Author, "Aptitudes and Aptitude Testing"

AT A time when employment is increasing, there is good reason why all who employ workers should scrutinize anew their ways of making choice among applicants. To distribute the various openings discriminatingly to those candidates who show the most promise, is obviously in the general interest as well as in the interest of employers and workers. And so this conference on Job Tests has met to take account of stock.

Those representatives of the Psychological Corporation and the Personnel Research Federation who arranged this session, had, I am sure, no wish to limit its scope when they chose the succinct title, "Job Tests." For present purposes a job is any sort of employment, whether the work to be done is heavy manual labor, bench work, office work, supervision, selling, teaching, research, or management.

Nor are we expected to follow common usage by restricting the term "Job Tests" to those tests designed to sample the applicant's skill or proficiency in doing today the tasks of a specific job. Few jobs are static. They change somewhat from month to month if not from hour to hour. An employer wants to estimate not only the candidate's present proficiency but also his versatility. His capacity for learning greater skill on the specific job is in question; also his promise of future growth and advancement to more responsible posts.

Our topic then includes tests of ability to learn added knowledge and skills, to exhibit good judgment and intelligence in dealing with problems social or mechanical, mathematical or verbal, concrete or abstract. We are not limited to those trade tests or proficiency tests which help to answer the question as to a candidate's competence at the moment.

Traits and Interests

Measures of vocational interests also appropriately come within the scope of this symposium. From the standpoint of employer as well as of worker, fitness for a job includes capacity to acquire a liking for it, to find satisfaction in it. This is said not because interests may furnish clues to abilities. The relation between occupational interests and abilities is not very close. But interests deserve consideration in their own right. Employers know how much better is the spirit throughout their organizations when every supervisor and employee is engaged in doing work he likes to do. And as for the individual himself, the degree of satisfaction he finds in his daily occupation is no less important than a difference in wage.

America has been prone to overemphasize the values of productivity, efficiency, competence. These values should not be allowed to obscure those personal values of enjoyment occurring only to the man who likes his work. If an applicant lacks capacity to achieve a genuine interest in the job so that its pursuit yields inward satisfactions, the sheer capacity to acquire the requisite proficiency is but a cold and steely asset. Tests to measure vocational interests therefore need not be excluded from today's discussion.

We might even, with some hesitation, go one step farther. Measures of traits of character and personality likewise logically come into consideration. My personal preference, however, would be to pass over in silence these vast areas, because research has as yet provided employers with personality tests of only uncertain dependability. To be sure, some instruments like the word-association tests have long given promise of usefulness in differentiating individuals with marked aptitude for selling, for research, or for executive work. Other uses for the A-S Reaction Study, the Kent-Rosanoff, the Bernreuter, and similar personality tests are proposed on every hand. The traits they aim to measure are highly significant.

But until more progress has been made in fundamental investigations and in practical tryouts, is it not the part of wisdom for employers and placement officers not to rely heavily on personality tests but to concentrate on improving their techniques of interviewing, of personal observation, and of ascertaining from the records of behavior and accomplishment on previous jobs and in school the most reliable indications they can secure regarding a candidate's personality and character? If a personality test is included in an employ-

ment battery, let it be for research purposes. For the present, exceptional scores should properly be construed as indicating a need for careful check-up by other means than tests.

To adopt this attitude toward tests of personality does not prevent anyone from maintaining a similarly conservative position with regard to the place and use of tests for measuring a good many other kinds of traits, including some for which widely heralded tests of known reliability are available. An employment officer may find reason for questioning whether the traits measured are really as vitally important for success on a particular job as they appear to be; or he may question whether an applicant who lacks them may not be able to compensate for his deficiencies by superior excellence in traits not measured. He will, of course, take into the reckoning not only the records supplied by psychological examinations, but all the information available, from whatever source.

It is no disparagement of tests to recognize that in many an employment situation their best usefulness is, not to give the final answer, but rather to raise now and then a warning signal which draws attention to the advisability of further check-up before final hiring or placement.

I cannot forbear stating at the outset of the conference, in the presence of any here who may be novices in employment testing, a few of these well recognized principles. Most of you with experience in this work will readily agree with the principles I have just stressed. You will also agree that the best estimates of what an applicant can probably do in the future are based on a careful scrutiny of what he can do now, and of what he has done. When available information as to his past accomplishments is incomplete, hazy, or irrelevant, his performance in appropriate job tests, that is, in standardized tasks, provides a sampling of what he is able to do now, and of his ways of dealing with such tasks. These specimens of his behavior, measured and expressed as linear scores, are only samples which may or may not be dependably representative of his best performance.

Errors in Estimates

A sampling error—be it large or small—is inherent in the very nature of all testing. This makes it necessary for every user of test data to keep in mind for each test used, its Standard Error of Measurement, or some similar figure which expresses the width of the zone of approximation on either side of an obtained score, within which the person's true score in the ability measured by the test probably lies. In other words, it is essential not only to know the coefficients of reliability of the tests used, but also to appreciate what these statistical figures mean at the time when the significance of individual scores is being appraised. The reliabilities of competing tests are always taken into account when one of them is being chosen for a specific purpose. It is no less important to reckon with

reliabilities or Standard Errors of Measurement when the scores made by two applicants are being compared.

Also, the question has to be raised as to the validity of the test—not its validity in general, for there is no such thing, but its validity in the specific situation. To what extent does it measure abilities or other traits essential to job performance and progress? How closely do scores correlate with measures of subsequent success in this line of work? How large must be the deviation of an individual's score from the general population average or from the average of his own group, in order that his relative superiority or inferiority in the test may have significance as an indicator of probable success or failure if he is employed? Are the available norms and the validity data such that the individual's chances of success may be computed? These are some of the questions which keep recurring whenever employment tests and the measures they yield are put to use.

Hiring as an Art

The mathematical probabilities can be computed by a well-trained statistical clerk. But a clerical computer, no matter how proficient, cannot relieve the psychological examiner, the interviewer, and the employment executive of responsibility for weighing not only the chances as computed from test data, but also the probabilities as inferred from all the available facts considered in combination. To be sure, tests are sometimes used merely as an economical device for sifting out from a large number of applicants a few for serious consideration. But when the scores also enter into the process of final selection, they do so as components, supplements or correctives of an overall judgment, a judgment that is most likely to be right when it is made by an employment officer who understands the job and the personalities involved, and who knows the significance *in his organization*, not only of the test scores, but of facts regarding age, schooling, physique, racial stock, intelligence, personality traits, character, and previous experience as brought to light by the interviewer. Hiring and placement is an art, an art which scientific method supplements but does not replace.

The theory of aptitude implies that a person's potentialities are fairly stable. If he gives clear evidence today of ability to learn to play the flute and of inability to learn accountancy, we should be amazed to find tomorrow that his aptitudes in these directions were reversed. Human nature is never as unstable as that. To be sure, we know that a person will not in all respects be exactly the same tomorrow as he is today; and five years hence he may quite conceivably have developed or retrograded in ways at present impossible to anticipate. Favorable opportunities may encourage the ripening of latent talents now unsuspected, while other aptitudes may lapse through lack of timely exercise. What at that time he will be able to learn to do is a func-

tion of his present capacities and purposes, and also of the experiences in store for him.

A theory of aptitude must not assume that each of the factors determining a person's aptitudes is constant in the sense that it will not alter, more or less, with time. We must, however, assume—if the concept of educational and vocational aptitudes is to have any meaning at all—that the changes which undoubtedly do take place in the relative potency of these factors are rarely sudden, and that they occur within limits which can often be ascertained in advance.

Interpreting Test Scores

When thinking about a person's ability as expressed by a single score on a particular test, his examiner notes not only the point where the obtained score is located on a scale or in a table of norms. He thinks of a *zone*, a band or penumbra of values about the point which the person's true score probably lies. No examination, no test, no instrument of precision, yields a perfectly reliable measure of a person's ability to do just such tasks as those set by the test. His true ability in such tasks, to be sure, approximates more or less roughly the ability he demonstrated when he took the test. The more reliable the test, and the more skilfully it has been given, the narrower is this zone of approximation. With a highly reliable test, the chances are good that an estimated true score approximates an obtained score fairly closely. But even here it is safer to think of the zone or band within which his true score probably lies, rather than to think only of his reported score, or of his estimated true score.

When evaluating an applicant's scores, it is not always remembered that an estimated true score is always *nearer the mean* of the standard scale than is the obtained score from which the estimate is made. If the reliability of the test is high, this regression toward the mean is slight; but as reliability diminishes, the tendency increases for true scores to approach the mean. At the lower limit—that is, in the case of a hypothetical test with no reliability whatsoever—everyone's "true" score would be precisely at the middle of the scale, whether estimated from a high obtained score or a low one; and the chances would be zero that any other score would more correctly represent a person's performance in the task set by such a perfectly unreliable test. The interpreter of scores must bear in mind this tendency of true scores to be nearer the mean than the obtained scores from which they are estimated.

Scores which deviate most widely from the average—the extremely high or low scores in which an examiner is certain to be most interested—are the very ones which have to be discounted the most. So far as the statistical probabilities are concerned, the chances are that the person's true abilities do not deviate from the average quite as much as these extreme scores would at first indicate.

This same principle holds when es-

timating a person's score in a criterion of subsequent accomplishment from his score in an aptitude test, when the coefficient of correlation between test scores and this criterion is known. The conservative examiner keeps before his mind's eye the zone of approximation—narrow or wide—within which the person's ability in the criterion probably lies; for the chances are only 68 in a hundred that the actual criterion score will be somewhere within a range represented by ± the Standard Error of Estimate on either side of his most probable score.

Cumulative Tests and Records

It is, however, quite within the power of examiners to narrow somewhat the zones of uncertainty. A single straw tells which way the wind blows; but an anxious farmer looks to his weather vane, and a meteorologist uses an instrument which records velocity as well as direction. The psychometrist likewise spares no pains to get the most reliable measures of aptitude he can. He realizes clearly how wide the zone of approximation is whenever an estimate of capacity for future accomplishment is based on a single test score. If the test is repeated and the average of the two performances is computed, the combined score yields an estimate not twice as good, but nevertheless better than that from a single measure. And when a whole battery of pertinent tests is brought to bear, the properly weighted contribution of each to the total score makes further inroads against the zone of uncertainty. Now bring into the picture the developmental history from the cumulative record, and all that has been learned in interview. Ascertain whether other pertinent facts tend to conflict with or to confirm the test indications. If most of the data harmonize, if they are seen to point even with uncertain fingers in the same direction, the examiner is warranted in arriving at tentative conclusions which he should hesitate to make in the absence of such *cumulative* indications of aptitude.

Recent Advances in Testing

At this point mention may be made of recent advances in psychological testing, whereby the reliability of certain measures has been raised and their dependability increased as symptoms of aptitude.

The techniques of factorial analysis developed by Thurstone are yielding deeper insights into the meaning of scores.

The optimal weights to be attached to various measures when used in combination are being ascertained with the aid of multiple regression equations.

At the same time, jobs are being studied more intensively, and the baffling problem of finding valid criteria of satisfactory performance is being attacked rather more energetically than of old, for instance, by a research staff in the U. S. Public Employment Service, and the psychologists at Procter and Gamble.

Of specific tests, we take note that

the I. E. R. Assembly Tests for Girls has been revised by Burr and Metcalfe, shortened, simplified in its administration, and made more objective in its scoring methods. Only seven of the original eleven sub-tests have been retained. The battery can now be given with a 30-minute time limit, with confidence that any woman or girl who has not finished all seven tasks within that time is unlikely to excel in a factory job, working with her hands. The seventh sub-test, paper-trimming, has proved to be especially useful as a measure of manual coordination. Two of the other sub-tests measure aptitude for the simplest packing, wrapping and assembly jobs. Two require the kinds of manual and perceptual abilities needed in more difficult assembly. And two are indicative of the candidates aptitude for training in needlework. A minimum critical total score of 38 has been found to indicate lack of aptitude for factory work of any sort.

Tests of Versatility

Frazier's Card Dropping Tests developed several years ago in the paper-box-making plant of the Dennison Manufacturing Co. as part of a battery for measuring the kind of manual versatility required by many sorts of bench-work, now comes freshly into the picture. This test sets four simple tasks and yields five separate measures of the applicant's manual dexterity. Frazier wanted to hire girls who subsequently, after six months or a year of training on the job, would show satisfactory manual versatility, in the sense that they could rather quickly shift from a job on which they were quite proficient to a similar but slightly different job, without having to spend too long in working up the new skills. His most significant discovery was this: The successful girls turned out to be those who had done better than average on all, or practically all, of the dexterity tests in the battery. Candidates who had done extremely well on some of these tests but were a little below average in others, lacked the manual versatility needed in bench-work of this kind.

The Kent-Shakow form-board has for several years been recognized as a promising means of measuring intelligence in dealing with spatial relations—an essential component of mechanical intelligence. But general and industrial norms have been lacking. These are now being supplied, thanks to the research activities of the Cincinnati Employment Center, and this test may now be expected to take its place as one of the useful aids in estimating the relative promise of candidates for positions such as machine-shop apprentice, and candidates for training in draftsmanship, difficult assembly jobs, and engineering.

Stanford-Binet Revised

In the field of intelligence testing, the most interesting news is that Terman and his collaborators have completed a thorough revision of the Stanford-Binet Scale. Unevennesses have been ironed out. The scale has

been extended downward, and also upward to the superior adult level. Moreover, two alternative equivalent sets of tasks are provided, so that an individual may be re-tested when necessary without using the same problems. The test materials and equipment, together with a book by Terman describing this revision and its uses, will be available from Houghton, Mifflin & Co. in January. A test of this kind is of interest in business and industry, not alone because of what it can tell about an applicant's general level of intelligence. Some of the tasks require verbal facility; others, numerical or mathematical ability; still others, ability to deal with space relations, or to exercise mechanical ingenuity, or to analyze, or to see abstract relationships. By taking note of the partial scores—the detailed features of the individual's intelligence profile, as it were—it is possible to estimate an applicant's relative aptitude for certain kinds of training. The Vocational Service for Juniors, for example, has found that reference to such Binet test profiles is of assistance when comparing a young person's aptitude for technological work with his aptitude for linguistic training. It may well be that research with these Binet tests in industry will eventually demonstrate for them a field of usefulness comparable to that which they have long filled in schools and social agencies.

Some of the group tests of intelligence, too, have been subjected to the fine-toothed comb of item analysis, to locate and get rid of the "bugs," the antiquated, ambiguous, or useless items. The widely used Bureau Test VI, recently revised in a few of its details, is now being subjected to a more thorough overhauling by Bennett of the Psychological Corporation.

Short but fairly reliable mental alertness tests of this sort will always have a place in employment practice, when time is lacking in which to administer more detailed and comprehensive examinations. A definite tendency may be noted, however, in industry as an education, toward the abandonment of omnibus tests which yield but a single general score in favor of batteries like the Scovill Classification Test which measure separately several important components of general ability. Such tests take longer to give; but the scores are more significant when an applicant's aptitudes are in question.

As for aids in ascertaining vocational interests, the most important development of the past year has been the appearance of Strong's Vocational Interest Blank for Women.

Training and Research

In conclusion may I leave in your minds two thoughts with reference to conditions most essential to future progress.

First, the selection and administration of aptitude tests, and above all the interpretation of test scores, is a technical matter, requiring mature judgment and wide familiarity with the various occupations, as well as a

mastery of differential psychology and the statistical theory of probabilities. The task is much too important and complicated to be turned over to a member of the employment staff with little psychological background except what he has got out of books on the subject. Such a plunge into experimentation with the practical use of tests has sometimes been made, with trivial, if not shocking, consequences. Curiously, this gamble has been taken by judicious executives who would think twice before putting the physical examination of their families and employees into the charge of a medical graduate who had not yet had his two years of interneship. There is need today for more and better training for employment examiners, training of a joint cooperative sort, so that employment managers and counselors who know the occupations may become grounded also in the fundamentals of vocational psychology, and so that psychologists may learn intimately the world of industry.

Second and finally, the most vital need of all is for research—brilliant, thorough, persistent, basic research. Aptitude testing has indeed progressed far since Sir Francis Galton and McKeen Cattell more than half a century ago first sketched the outlines of differential psychology—thanks to Thorndike, Binet, Witmer, Terman, Münsterberg, the Army psychologists, the Carnegie group, Link, Poffenberger, O'Rourke, Viteles, Hull, Pond, and many besides. These have laid solid foundations. On their work, industry may now erect, if it will, a superstructure of sound practice. The time has arrived to go about it with a thoroughness comparable to that of the industrial research laboratories for chemical and physical investigation, as Procter and Gamble have been doing for several years.

Employment is steadily on the increase. There are shortages in many lines of skilled and executive work which can be filled only by training new employees. The number of applicants is large. Their aptitudes are varied. The possibility of choosing for each vacancy a highly promising candidate was never better. This situation is an ideal one in which not only to apply what is now known, but also to undertake research which will push forward the boundaries of knowledge regarding aptitudes and aptitude testing.